Brebner Flat
Non-Native, Invasive Plants (Weeds) Report

Prepared by:

Claudia U. Rumold

Botanist, Idaho Panhandle National Forest

For:

St. Joe Ranger District

Idaho Panhandle National Forests

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Reported mileages are estimates and may vary depending on how they are rounded and what models and equations they are used for or result from.

Contents

Introduction – Non-Native, Invasive Plants (Weeds)

Definitions

Noxious weeds are non-native, invasive plant species that have been officially designated as such by Federal, State, or County officials. In *Weeds of the West*, a weed is defined as "a plant that interferes with management objectives for a given area of land at a given point in time" (Whitson et al. 1992). The Federal Noxious Weed Act of 1974 defines a noxious weed as "a plant which is of foreign origin, is new to, or is not widely prevalent in the United States, and can directly or indirectly injure crops or other useful plants, livestock or the fish and wildlife resources of the United States or the public health" (P.L. 93-629).

The Idaho Noxious Weed Law defines a "noxious weed" as any non-native plant species already established in, or introduced to the State, which may render land unsuitable for agriculture, forestry, livestock, wildlife, or other beneficial uses and is further designated as either a State-wide or County-wide noxious weed (Idaho Code 24 Chapter 22). Both Federal and State laws define noxious weeds primarily in terms of compromising commodity uses of the land. Increasingly, though, the impacts of non-native, invasive species on non-commodity resources—such as water quality, wildlife, and biological diversity are also of concern.

Purpose of this report

This report was prepared in accordance with Forest Service Manual FSM 2900, Invasive Species Management (USDA 2011). Forest Service direction in FSM 2903.4 states: "Determine the risk of introducing, establishing, or spreading invasive species associated with any proposed action, as an integral component of project planning and analysis, and where necessary provide for alternatives or mitigation measures to reduce or eliminate that risk prior to project approval."

This report analyzed the existing condition of the project area and the risks and effects of invasive plant introduction and spread associated with the proposed action. All alternatives comply with Forest Service policy and direction contained in FSM 2900. See pages 13-15 of this report for pertinent regulatory frameworks and compliance.

Habitat vulnerability and non-project dependent vectors

The spread of non-native, invasive plants (referred to here as weeds) can in large part be attributed to human-caused dispersal (e.g., by way of vehicles and roads) (Roche and Roche 1991), contaminated livestock feed, contaminated seed for revegetation, and ineffective revegetation practices on disturbed lands (Callihan et al. 1997). The introduction and encroachment of species such as Canada thistle, Dalmatian and Yellow toadflaxes, and Spotted knapweed have had negative economic and environmental repercussions, for instance, outcompeting native flora and reducing native biodiversity (Vallentine 1989). These weed species have been established throughout the St. Joe Ranger District (RD), along travel routes (roads, trails) and associated with timber harvest units (e.g., within units, at access points, at landings).

Vulnerability to non-native, invasive species invasion and establishment is greatly influenced by plant cover, soil cover, and overstory shade. Open habitats (low to no canopy cover) are more vulnerable to weed establishment, which do well in sunny conditions. Moreover, any habitat is made more vulnerable by soil disturbance, which provides ideal conditions for pioneer species like weeds to out-compete native plants.

Any activity that has the potential to move soil or plant parts (e.g., weed seeds, propagules, and other reproductive parts) from one location to another has the potential to act as a vector and facilitate weed introduction and invasion. Non-project dependent activities that can act as vectors include (but are not limited to): past and ongoing roadwork, woodcutting, timber management, motorized vehicle use, wildfire suppression, and recreational activities. The areas at greatest risk to weed introduction/establishment are those located next to roads. Roads provide for the dispersal of weeds via three mechanisms: providing habitat by altering conditions, making weed infestation more likely by stressing or removing native vegetation, and allowing easier movement of weeds by wild or human vectors (Trombulak and Frissell 2000).

In northern Idaho, most weed species are seen to proliferate in early successional stages, but to reduce in density as the canopy cover increases (Zack 1999). However, meanwhile, existing weed populations serve as seed sources for future expansion of infestations. Specifically, species like Spotted Knapweed and St. John's Wort produce seedbanks: large quantities of seed that remain dormant in the soil for many years, until disturbance creates conditions favorable for their germination and growth. As discussed below, disturbed soils and dry, sunny conditions are favored by weeds.

Forest weed management strategy

In accordance with the 2015 Forest Plan and the St. Joe RD Noxious Weeds Final Environmental Impact Statement (USDA 2000), the overarching district strategy with respect to weed management is to contain current weed infestations and prevent the spread of weeds to vulnerable, but generally uninfested, areas. As part of this approach, weed management aims to:

- Protect the functionality and biodiversity of the St. Joe ecosystem by preventing or limiting the spread of non-native, invasive species that may displace native vegetation
- Eliminate new/potential invader species before they become established (i.e., prioritize their treatment over that of widespread weeds (see Appendix 1)
- Protect sensitive and unique habitats (e.g., areas of documented threatened, endangered, and sensitive; specially designated areas, like Research Natural Areas (RNAs)
- Reduce weed sources at common areas of dispersal, like recreation sites (campsites, trailheads) and travel routes
- Comply with Federal and State laws regulating the management of invasive species.

Methodology

Analysis Area and Temporal Scope

The 11,779-acre Brebner Flat project area is located on the St. Joe RD of the Idaho Panhandle National Forest, directly south of Avery, Idaho, in portions of Benewah and Shoshone Counties. The project area constitutes the spatial boundary for the analysis of direct, indirect, and cumulative effects to weeds from the proposed action.

Short-term temporal effects last from time of implementation to five-to-eight years after the last activities take place. After this time, most short-term effects are expected to diminish. Long-term effects may be evidence 20+ years after the last implementation of project activities. Long-term effects may exceed 50 years, but predicting effects at this timescale is too speculative for reliable analysis.

After circa 20 years, post-activity vegetation recovery (i.e., increased canopy cover), weed control efforts, and restoration would inhibit weed growth to a certain degree. At the same time, some weed species have seeds that remain viable in the soil for several years. For instance, Spotted knapweed is characterized by as much as 5% seed viability after 7 years. And under field conditions in the area of Spokane, Washington, researchers estimate Dalmatian toadflax seed longevity at 10 years, with duration of viability dependent on soil and climatic conditions (USFS 2013). Such seed longevity permits these species to take advantage of future habitat alteration/disturbance.

Resource Indicators and Measures

Certain proposed project activities may contribute to the introduction of new weed species and the spread of existing infestations in the project area. These include:

- Equipment used in logging, aquatic restoration, and roadwork could spread existing weeds within the project area and inadvertently introduce new invasive plant seeds and propagules from other sites to the project area
- Timber harvesting increases sunlight reaching the understory (by removing canopy) and causes soil disturbance. Both of these factors create conditions favorable for weed species' establishment and spread.

Table 1. Resource indicators and measures for assessing effects to invasive weeds

Resource indicator	Measure	Source
Weed introduction & spread with equipment via roads	New system road construction (miles)	Forest Service Manual FSM 2900, Invasive Species Management (USDA 2011). Forest Plan 2015, NF DC- Veg 10, FW-OBJ-Veg-02)
	Reconstruction & temporary road construction (miles)	
	Non-system road decommissioning (miles)	
Soil disturbance & changes to the light/moisture regime in treatment units	Acres of treatment units	Forest Service Manual FSM 2900, Invasive Species Management (USDA 2011). Forest Plan 2015, NF DC- Veg 10, FW-OBJ-Veg-02)

Information Sources

Plant surveys were conducted in the project area in 2014–2015 and 2018 in areas of proposed ground disturbance (logging units, areas of roadwork). All plant species encountered were documented (see project file for survey records) and the location of weed infestations were recorded. The Forest Service Activity Tracking System (FACTS) database provided data regarding previously documented weed infestations and weed treatment activities.

Methods

The risk of weed spread and of the introduction of new/potential invader species from the proposed activities is estimated based on peer-reviewed scientific literature on the topic and professional

judgement. Although difficult to quantify, cumulative effects to weeds from proposed activities may be described as follows:

- Very low = no measurable effect on existing weed infestations or susceptible habitat
- Low = existing weed infestations and/or susceptible habitat not likely affected
- Moderate = existing weed infestations or susceptible habitat affected, with the potential for expansion into uninfested areas and/or establishment of new invaders
- High = weed infestations and/or susceptible habitat affected, with a high likelihood of expansion into uninfested areas and/or establishment of new invaders.

Affected Environment

This section describes the existing conditions in the project area as related to weeds. An understanding of existing conditions (as created by past, present, and reasonably foreseeable factors) is necessary in order to be able to gauge the interaction between these and project-related variables.

The following table lists the weed species documented in the project area, as well as their ranking and associated treatment strategy.

Table 2. Weed species documented in the project area

Species	Common name	Forest Service Ranking	Treatment objective
Centaurea stoebe* ssp. *micranthos	Spotted knapweed	Widespread	Contain within infested area and reduce plant populations
Hypericum perforatum	St. John's Wort (Goatweed)		
Cirsium arvense	Canada thistle		
Cirsium vulgare	Bull thistle		
Cynoglossum officinale	Houndstongue		
Leucanthemum vulgare	Oxeye daisy		

Currently, weed infestations are located mainly along roads (see project record for specific location data). As discussed in the Introduction to this report, the weeds' roadside location likely reflects their mode of entry to, and spread within, National Forest land as a result of past management activities like logging and roadwork, along with past and ongoing motorized vehicle use by the public. Specifically, in addition to roads used to facilitate forest management and roads open to public vehicles, the project area also includes over 50 miles of off-road motorized trails (refer to Brebner Flat EA, Recreation section).

Domestic and wild animals can contribute to weed establishment/spread. No grazing allotments are located in the project area, such that contaminated livestock feed is not a factor contributing to weed invasion/spread in the project area. However, to a limited extent, wild animals may also inadvertently contribute to weed spread, for instance, by consuming weed seed heads and fruits and depositing them with their waste elsewhere in the forest. Additionally, weed seeds can adhere to animal fur and be transported in this way. Houndstongue, present in the project area, is particularly susceptible to this mode of transmission because of its burr-like seeds.

The annual district program of weed control prioritizes weed treatments across the St. Joe RD according to species ranking and available funding. In the project area, recent weed management efforts (2014–2018) took place along Kelly Creek Road and Forest Service Roads 1235, 1236, and 1251 for a total of 140 acres of herbicide treatment. Although, as seen in Table 2, all weed species present in the project area are classified as 'widespread' by the forest, Houndstongue has been prioritized for treatment because of its fairly restricted distribution on the St. Joe RD and because of its ability to spread beyond roadsides by adhering to animal fur.

Of the 11,779 acres comprising the project area, 2,959 acres are privately owned. A summary of activities on these private lands from 2003 to 2018 indicates that a total of 1,218 acres were harvested during this time (1,030 acres overstory removal, 98 acres clearcut) (IDL 2018). Consequently, soil disturbance and canopy removal associated with roadwork, road use, and logging on private land is likely a past and ongoing factor contributing to the risk of weed invasion/establishment in the project area.

Environmental Consequences

No Action

Direct and Indirect Effects

Weed Introduction and Spread via Equipment on Roads

Under the No Action Alternative, roads and trails in the project area would continue to serve as vectors for weed invasion/spread. Motorized recreation vehicles introduce weed reproductive parts to the project area. The on- and off-road (authorized and unauthorized) motorized activities disturbs soils and creates wind gusts, thereby creating habitat vulnerable to weed establishment and moving weed seeds, respectively.

No road decommissioning would take place to remove unused road segments from the system. These systems would continue to provide habitat for weed infestations, as well as contributing to the existing weed seedbank within the project area.

Disturbance from Vegetation Management and Associated Activities

No logging, fuel reduction, roadwork, or other associated activities would take place under the No Action alternative. A continued gradual reduction in forest canopy cover would occur in stands with high insect and disease-induced mortality, especially in dry forest habitat (e.g., Grand fir/Douglas fir) stands. Moist forest habitat and riparian areas would likely not experience much canopy loss. While increased sunlight in the understory of drier forest stands might indirectly alter habitat conditions in a way that favors weeds, the gradual or partial nature of this type of canopy reduction, along with the lack of soil disturbance or introduction of new weed sources via machinery, would not necessarily create conditions contributing to widespread weed establishment or spread. Instead, weeds would likely remain confined to their current locations along travel routes—at the most perhaps extending into areas of decreased canopy cover adjacent to roads/trails. In the case of the project area, proposed treatment units are located in moist forest habitat. Consequently, no adverse direct or indirect effects are expected related to weed spread because of a lack of forest management activities.

Under the No Action alternative, a lack of the proposed vegetation management activities would contribute to continued fuel loading in the project area. This might indirectly increase the risk of a high

severity wildfire and severely burned areas would have more areas of exposed mineral soil, which is more susceptible to weed invasion. Although it is not possible to predict the occurrence of a wildfire, the fire suppression activities associated with such an event would increase the risk of the introduction of new weed sources and species hitchhiking on vehicles/equipment and the soil disturbance caused by machinery (e.g., making fire lines) would further alter habitat in a way favoring weed encroachment.

Cumulative Effects

The cumulative effects analysis for the No Action alternative considered the effects of past, present, ongoing, and reasonably foreseeable activities to weed introduction/spread.

Past activities have led to habitat modification and fragmentation in and around the project area. Activities and events that have likely contributed to the past introduction and establishment of weeds in the area include roadwork (construction, decommissioning, and maintenance), timber harvest, prescribed burns, vehicular traffic, recreational uses, and wildfires. To a degree, past efforts by the district weed treatment program have been effective in temporarily reducing and/or containing individual weed infestations.

Given existing weed populations, their associated seedbank, and ongoing activities, there is a continued moderate risk of the introduction to and spread of weeds within the project area. Current ongoing and reasonably foreseeable activities include fire suppression, non-commercial thinning, white pine pruning, road maintenance, permitted outfitter and guide activities, public firewood gathering, public use of motorized vehicles, and other recreational activities such as berry-picking, hunting, and hiking. These activities could result in new disturbed sites available for colonization by weeds. Ongoing use of the road system in the project area by motorized vehicles will continue to add to weed introduction and spread. The district weed treatment program will continue its efforts contingent on funding and priorities.

Under the No Action alternative, cumulative effects to forest stands experiencing high insect and root disease-related mortality may be low to moderate in the event of a wildfire. Following a fire, nearby weed infestations may spread into burned areas by way of wind and animal vectors. Also, the fire and consequent disturbed soils may provide ideal habitat conditions for the growth of weeds from existing seedbanks. Moist to wet forest habitat typically burns less intensely than drier forest and the fire interval is long for the former. Effects from wildfire to moist forest habitat, such as is found in the proposed treatment areas, would be low to moderate with respect to weed invasion/spread.

Cumulatively, the effects of the No Action alternative—in combination with past, ongoing, and reasonably foreseeable actions—would be low because no soil disturbing activities would take place and district weed treatments would continue.

Proposed Action

The Brebner Flat project includes 1,719 acres of commercial timber harvest, fuel reduction for those acres following timber removal, and roadwork to provide access to activity areas (Table 3).

Table 3. Environmental effects of Proposed Action

Measure		No Action	Proposed Action
Weed introduction & spread with equipment via roads (miles)	New road construction	0	2.04
	Non-system roads to be added to the National Forest System	0	1.72
	Temporary road construction	0	4
	Road reconstruction	0	3
	Road maintenance	0	47.8
	Non-system road decommissioning	0	1.30
	Road storage	0	10.29
Soil disturbance & changes to the light/moisture regime in treatment units (acres of silvicultural treatment units)		0	1,719

The following design features would be implemented as part of the proposed action in order to reduce the spread of existing invasive weeds and prevent the introduction of new/potential invader species within the project area:

Design Features

To help reduce the spread of existing weeds and prevent the introduction of new invader weed species:

- All construction and timber sale contracts would include a provision for effective equipment washing to remove soil and any adhering plant parts (seeds, propagules)
- The timber sale contract would include a provision for herbicide spraying of existing weeds on roads used during the timber sale before and after log hauling
- Weeds would be treated on existing roads slated for storage or decommissioning, if roads are not brushed in prior to storage/decommissioning
- In adherence to guidelines provided by the St. Joe Noxious Weeds Final Environmental Impact Statement and Record of Decision (USDA Forest Service, 1999), measures to protect TES plant population viability and habitat capability would be implemented during weed treatment
- Timber sale contract provisions would require purchaser/contractors to seed and fertilize areas of soil disturbance associated with skid trails and landings, using a seed mix approved by an agency botanist at the time of contract preparation
- All plant materials used in the project, including grass seed and mulch, would be certified noxious-weed free. Grass seed would be certified, blue-tagged seed
- Where deemed appropriate by the project administrator or botanist, mulching would take place as part of revegetation efforts
- Use of native plant materials is required for restoration projects (FSM 2070.3, Amendment 2008). Locally-obtained materials are preferred, but if unavailable or economically unfeasible, appropriate materials that meet Region 1 guidelines (Northern Region Native Plant Handbook, 1995) may be substituted

Direct and Indirect Effects

The various activities comprising the Proposed Action have differing direct and indirect effects:

Weed Introduction/Spread by Equipment and via Roads

As discussed in the Affected Environment section, weeds are currently widespread along roads and trails in the project area. Weeds became established before the Forest Service required measures (i.e., 'best management practices' or 'BMPs') to reduce their introduction and spread as a consequence of management activities. As noted, key mechanisms of spread have included road maintenance, motorized use, and timber sales. Additionally, in the past, the Forest Service used grass seed mixes including species now considered undesirable because they are non-native and persistent.

Effects to weeds by roads may be both direct and indirect. Weeds may be directly introduced by being carried in on equipment/vehicles. The open, disturbed conditions along road corridors indirectly encourage weed establishment and spread. For instance, the continued soil disturbance and wind generated by motorized vehicle use further perpetuates habitat conditions favorable for these species.

Project design features stipulate that all construction equipment would be cleaned before entry onto Forest Service lands, according to provisions in the timber sale and roads contracts. Roads that are used in the timber sale would be treated with herbicides before and after logging. Brushed-in roads that are not accessible by spray equipment would not be sprayed before reconstruction, storage, or decommissioning. These required design features would reduce, but not eliminate, weed introduction and spread.

Typically, multiple herbicide treatments are necessary to control weed infestations, because of the soil seedbank that accompanies existing weed populations. The weed management program on the district is focused on system road right-of-ways and future weed treatment is planned for the project area. Nevertheless, infestations resulting from project-related road management activities may not be contained or controlled in years subsequent to proposed management activities due to funding/competing priorities.

Indirectly, over an estimated period of 20 years, native vegetation on stored and decommissioned roads would re-establish, shading out most invasive species that may have become established. However, certain species, like Hawkweeds, are shade tolerant and could remain until released by disturbance.

New, temporary, and non-system roads

All roadwork activities involve machinery and soil disturbance and consequently, run the risk of weed introduction to/spread within the project area. The current, widespread presence of weeds in the project area and the use of roads during and, in some cases, following project implementation, means that even if the design feature requiring the cleaning of machinery/equipment used in roadwork is effective, existing weeds may nevertheless be moved along these roads from one part of the project area to another (by equipment, vehicles, and animals).

The proposed new system road construction would permanently affect 2.04 miles. The new permanent roads would be accessible to administrative motorized use only and would be closed to public motorized use with gates or barriers. This means that their role as vectors for weed spread would be mitigated to a certain degree, although the road habitat would nevertheless be suitable for weed encroachment.

The proposed 4 miles of temporary roads would serve as vectors and suitable habitat for weed invasion/spread in the short term. Following implementation, temporary roads would be rehabilitated (de-

compacted and re-countered to the approximate contour of surrounding terrain and then seeded or covered with logging slash/other debris to prevent erosion and to accelerate hydrologic and vegetative recovery.

The proposed addition of 1.72 miles of non-system road to the National Forest System would increase the risk of weed introduction/spread. The non-system road is comprised of three segments. Of these, one would remain open, one stored for future use, and one closed with a gate. Gating would reduce the role of the newly added road segment as a vector somewhat, in contrast to the section that would remain open. The segment to be closed would serve as a short-term vector, until its closure.

Road reconstruction and maintenance

Three miles of existing stored roads would be reconstructed in order to make them suitable for log hauling, according to the current Idaho forest practices standards for water quality. Reconstruction activities would include brushing, short segments of realignment, widening, adding turnouts, and improving or adding drainage structures.

Maintenance would occur for 44 miles of road. Activities would include brushing, blading and shaping, cleaning ditches and culverts, improving drainage structures, and adding gravel to surfaces. Some minor areas of reconstruction (see above for reconstruction activities) may be necessary to address drainage and/or safety issues.

Non-system road decommissioning and road storage

The Proposed Action includes 10.3 miles of road storage and 1.3 miles of road decommissioning, following project implementation. Road storage and decommissioning have the potential to contribute to weed spread in the short term, because some of the roads are currently infested with weeds. Weeds would be treated before roads are stored or decommissioned, where roads are not currently brushed in.

Decommissioning not involving earth-moving (i.e., soil disturbance) would have no direct impact to weeds and would likely have long-term benefits, as the shrub layer would increase over time, eventually making vehicular traffic impossible on these sections. Culvert removal would affect moist and wet forest habitat (present in the project area) to a certain degree, but is considered low risk with respect to weeds. Road decommissioning involving earth-moving carries a greater risk with respect to weed invasion, but this is a short-term effect that dissipates once vegetation becomes established.

In the long term, the proposed non-system road decommissioning and long-term storage would decrease the mileage that could serve as a future vector to weed spread by 1.3 and 10.3 miles, respectively.

Weed Introduction/Spread related to Disturbance from Vegetation Management and Associated Activities

The proposed logging and associated activities carry a risk of directly and indirectly increasing the risk of weed introduction and spread. For the most part, effects to weeds these activities are indirect and cumulative, rather than direct.

As noted, herbicide treatment of roads used in the timber sale before/after logging and cleaning of construction equipment are two design features of the Proposed Action. These would help to reduce, but not totally eliminate, weed invasion/spread due to project activities. For instance, despite cleaning requirements, it is still possible that vehicles/equipment inadvertently directly introduce new weed seeds/propagules to the project area. Moreover, although herbicide treatments are effective in reducing existing weed populations, they cannot necessarily eliminate them completely (particularly a single treatment, e.g., pre-hauling). Consequently, a weed source would still exist and seeds/propagules could be

moved by project-related vehicles and machinery from an infested to an uninfested area, thereby spreading weeds within the project area.

Indirect effects from the Proposed Action concern the creation of habitat suitable for weeds through soil disturbance and canopy removal. In addition to the soil disturbance caused by timber harvest, burning, and related activities, the removal of the tree canopy by logging would further indirectly alter habitat conditions in the proposed treatment units, changing the light-moisture regime in these areas and creating drier, sunnier conditions in the understory. Prescribed burning runs the risk of exposing bare, mineral soils. The combination of disturbed soils and sunny, dry conditions is favored by the majority of the weeds that have established themselves in northern Idaho.

This indirect effect to habitat would diminish to a certain degree in the long term, when the regeneration of conifer stands and associated native shrub and other understory vegetation would create shadier, moister conditions not favorable to most weed species. Nevertheless, an overall increase in the presence of weeds may result from the proposed activities, as certain weeds can tolerate shade (Hawkweeds), sunnier microsites continue to support weed populations, and the soil seedbank from existing populations can support regrowth under future conditions of disturbance. Ongoing weed treatments (one of the project design features) would aid in reducing weed presence in some of the most vulnerable habitats (e.g., roads and landings).

Under the Proposed Action, regeneration harvest would be conducted on 1,719 acres in the project area. Regeneration harvest is a type of logging that removes most of the overstory, such that these acres would provide drier, open habitat suitable for weeds until tree seedlings grow big enough to shade the ground. Additionally, fuel reduction activities, underburning and grapple pile/burning, are proposed for 1,137 and 582 acres, respectively.

The various proposed activities differ in the nature and level of risk that they hold for weed invasion and establishment. Also, though, weed species' responses to different activities differs, although understanding of this dynamic is incomplete. Potential effects to weeds are described below.

Timber harvest

Under the Proposed Action, regeneration harvest would be conducted on 1,719 acres in the project area, removing most of the overstory from these acres. The proposed use of skyline harvesting for 86 percent of the treatment acres (1,480 of 1,719), along with the retention of coarse and woody debris (Soils design features #5-7), would help to minimize soil disturbance/compaction and maintain soil productivity and ecological function. Nevertheless, the drier, sunnier conditions following harvest would make these areas more vulnerable to weed establishment.

Fuel reduction

Fuels reduction would be implemented in all units following logging. Underburning is proposed for 1,317 acres; grapple pile and burn is proposed for 582 acres. Prescribed fire would directly affect some weed species and may indirectly affect some habitats, making them more susceptible to weed invasion.

A ground-based, mechanical method of fuel treatment, grapple piling would disturb the soil and provide habitat for weed invasion, with no further preventative measures. There is also the potential for equipment to spread weed seeds from infested sites to newly-disturbed ground, but grapple piling would be limited to the skid trails used for timber harvest. Contract provisions for construction equipment washing would

reduce the risk of weed introduction from outside the forest, but would not necessarily be able to address all spread between uninfested and infested parts of the project area.

Prescribed fire

Prescribed fire would be used to prepare regeneration harvest units for planting and to reduce fuels in these units. Prescribed fire may result in exposure of mineral soil, which would create a suitable seedbed for weed introduction. As noted, weed populations are documented in the project area, constituting a ready seed source. Although many of the weeds species documented in the project area invade after site preparation, they tend to decrease as the site becomes stocked with planted conifers and native vegetation. This is a long-term process of vegetation succession, taking up to 20-30 years or more to achieve canopy closure.

The Idaho Department of Fish and Game recommends native grass seeding on the areas burned for wildlife browse improvement. That may be accomplished to a certain degree, in the case of sites that are accessible. Some sites are too steep for people to walk and carry seed; helicopters may not be effective for spreading seed because grass seed is very light, helicopters create a lot of wind, and the helicopters cannot fly very close to the ground for safety reasons.

Some documented species-specific effects from fire include:

Spotted knapweed plants present before burning may re-sprout from root crowns and seedlings may emerge from the seedbank or invade bare ground from an off-site seed source following fire. The observed response of spotted knapweed to fire may vary according to region, with the density of the infestation, and depending on the severity and timing of the fire (low- versus high-severity fire microsites, spring versus fall burns) (USFS 2003).

Dalmatian and yellow toadflax plants are likely to be top-killed by fire; however, their deep, extensive root system is likely to survive even a severe fire and allows re-establishment of the population from vegetative buds on roots. The post-fire environment is well suited to establishment by seed and establishment may be encouraged where other species are reduced (USFS 2003).

Canada thistle varies in its response to fire—depending on vegetation and site characteristics, as well as frequency, severity, and season of burning. Fire can result in adverse effects (slight damage) to beneficial effects (enhancing) for Canada thistle plants, which can survive fire and re-sprout from its extensive perennial root system and can colonize bare ground via seedling establishment after fire. Several studies have indicated the presence of Canada thistle in burned areas, where it was absent from the pre-fire community and/or adjacent unburned areas (USFS 2003).

Cheatgrass is an invasive species that has been widely documented to increase on sites following fire (USFS 2003). The effect of cheat grass invasion on dry sites following fire is competition with native forbs for moisture, thus becoming the dominant ground cover. This species is not expected in the proposed units, which are primarily moist and wet forest habitat and therefore not suitable.

Fire is generally considered to encourage the establishment, vegetative spread, and increased density of St. John’s wort patches—by stimulating germination of St. John’s wort seed and sprouting in surviving St. John’s wort roots and root crowns. Several references indicate that St. John’s wort often occurs in previously burned areas, especially forested areas (USFS 2003).

Weed Treatment and Prevention.

Weed treatment and prevention would be performed according to the St. Joe Noxious Weed Control Final Environmental Impact Statement and Record of Decision (USDA Forest Service, 1999). As described in this document, integrated weed control methods would be used, including herbicide spraying, manual, cultural (seeding/fertilizing) and biological methods. Weed treatment and prevention measures would reduce, but not eliminate, the risk of weed spread in the project area.

Tree planting, gopher control bating, and future non-commercial thinning.

Tree planting, gopher bait pesticide application, and non-commercial thinning would have no effect on noxious weeds because their implementation would cause minimal, if any, ground disturbance.

Cumulative Effects

The Proposed Action would directly and indirectly increasing the risk of weed introduction and spread. Effects to weeds from the Proposed Action are primarily indirect and cumulative, rather than direct. In view of 1) project design features, 2) the different effects and degrees of effect from the various proposed activities, 3) the different weed species' response to different types of activities, the cumulative effects to weed introduction/spread from the Proposed Action is considered to be low to moderate.

Table 4. Cumulative effects to invasive weeds under the Proposed Action

Measure	Changes resulting from Proposed Action	Change resulting from past, present, and foreseeable actions	Cumulative impacts under the Proposed Action
Weed introduction and spread with equipment via roads			
Miles of reconstruction & temporary road construction	7	Weed populations are established on project area roads. Introduction and spread of invasive weeds is ongoing by vehicle traffic and road maintenance. Routine treatment of roads and trails is part of the District Noxious Weed Program.	Impacts in the near term would be low to moderate. Roads used in the Timber Sale would be treated. Measures to prevent introduction on equipment would be enforced. Decommissioned roads would be seeded and gradually revegetate in the long term (20 years+).
Miles of new road construction	2.04		
Miles of non-system roads added to National Forest system	1.72		
Miles of storage & decommissioning	11.59		
Acres of soil disturbance and changes to the light/moisture regime in treatment units			
Regeneration harvest and fuel reduction treatment (prescribed burning and grapple pile burning)	1,719	Weeds are present in managed stands, but typically are outcompeted after conifer establishment. This can take 20 or more years.	There may be an increase in weeds in vegetation management units in spite of design features for prevention. Features include treatment of the most susceptible areas in close proximity to treatment units such as roads and landings.

Regulatory Framework and Compliance

The Proposed Action includes provisions for minimizing weed introduction and, as such, would comply with requirements of federal and state policies, direction, plans, laws, and executive orders discussed below.

National Forest Management Act and the 2015 Forest Plan

The National Forest Management Act requires projects to be consistent with the Idaho Panhandle National Forest Land and Resource Management Plan (2015 Forest Plan). The 2015 Forest Plan provides guidance for project-level analysis. The plan lists the following direction for non-native invasive plants:

Desired Condition

FW-DC-VEG-10.

Newly invading, non-native invasive plant species are treated and populations are contained or eradicated. The weed program on the Forest uses integrated pest management approaches, including prevention and control measures that limit introduction, intensification, and spread due to management activities. Agreements with cooperative weed management areas assist in control efforts across jurisdictional boundaries (p. 14).

The St. Joe District has an active weed management program that uses a variety of treatment methods—including herbicide, mechanical, cultural, and biological to achieve results. All treatments are monitored for effectiveness. The District is an active member of the Inland Empire Cooperative Weed Management Area (IECWMA), a group of federal, state and local agencies combined with private citizens to work together on noxious weed issues, education, and control. With participation of group members and availability of Idaho State Department of Agriculture grant funds, more work can be accomplished than individual entities acting alone.

Objectives

FW-OBJ-VEG-02.

Non-native Invasive Plant Species – Over the life of the Plan, the outcome per decade is: (1.) All sites that are discovered with newly invading non-native invasive species are treated. (2.) The treatment of approximately 15,000 to 30,000 acres to reduce non-native invasive plant density, infestation size, and/or occurrence (these areas are also included in FW-OBJ-VEG-01) (p. 19).

The District treats invasive plant infestations each year as part of the Idaho Panhandle National Forests targets and objectives. New invader species are given the highest priority. Botanical surveys of the project area contain records of all plant species encountered, including non-native invasive plants (Botany Report). No new invader species were discovered, but, if found, they would be given the highest priority for treatment.

Executive Orders

The Invasive Species EO 13112, of February 3, 1999, was enacted to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause.

The Forest Service analyzes effects to the environment caused by management activities. Design criteria used in all projects minimize weed introduction and spread.

State and Local Law

Under the Idaho Noxious Weed Law (Idaho Code 24 Chapter 22) land owners and managers are required to control State listed noxious weeds on their property.

The St. Joe RD has an active Invasive Plant Management Program. Weed treatment is conducted annually across a variety of treatment sites, including road rights of way, trails, administrative sites, and recreation areas. The District is dedicated to weed prevention and uses design criteria to reduce the risk of weed introduction and spread with all projects permitted or implemented.

National Forest System Invasive Species Management Record Keeping Business Rules and National Standards (v04.01.2012)

In accordance with Forest Service Manual 2903 (Invasive Species Management) – Policy #14, which requires monitoring of weed treatment, all herbicide applications associated with the project would be monitored and reported in the NRM database and contract inspection reports.

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Appendix 1: Non-native, invasive terrestrial plant species targeted for control measures on the Idaho Panhandle National Forests

SCIENTIFIC NAME	COMMON NAME
POTENTIAL INVADERS (CURRENTLY ABSENT)[1]	
ACHILLEA NOBILIS	NOBLE YARROW
ALLIARIA PETIOLATA	GARLIC MUSTARD
ANCHUSA ARVENSIS	SMALL BUGLOSS
BASSIA SCOPARIA	BURNING BUSH
BUTOMUS UMBELLATUS	FLOWERING RUSH
CAMPANULA RAPUNCULOIDES	CREEPING BELLFLOWER
CONVOLVULUS ARVENSIS	FIELD BINDWEED
EUPHORBIA MYRSIPNITES	MYRTLE SPURGE
NARDUS STRICTA	MATGRASS
POLYGONUM SACHALINENSE	GIANT KNOTWEED
SALVIA AETHIOPIS	MEDITERRANEAN SAGE
SOLANUM ROSTRATUM	BUFFALOBUR
SORGHUM HALEPENSE	JOHNSONGRASS
TAMARIX SP.	SALTCEDAR COMPLEX
TRIBULUS TERRESTRIS	PUNCTUREVINE
NEW INVADERS	
ACROPTILON REPENS	RUSSIAN KNAPWEED
ANCHUSA OFFICINALIS	COMMON BUGLOSS
ARCTIUM MINUS	COMMON BURDOCK
BARBAREA VULGARIS	GARDEN YELLOWROCKET
BERTEROA INCANA	HOARY ALYSSUM
CARAGANA ARBORESCENS	SIBERIAN PEA SHRUB
CARDARIA DRABA	HOARY CRESS, WHITETOP
CARDUS NUTANS	MUSK THISTLE
CENTAUREA DIFFUSA	DIFFUSE KNAPWEED
CENTAUREA SOLSTITALIS	YELLOW STARTHISTLE
CHAENORHINUM MINUS	DWARF SNAPDRAGON
CHONDRILLA JUNCEA	RUSH SKELETONWEED
CRUPINA VULGARIS	COMMON CRUPINA
CYTISUS SCOPARIUS	SCOTCH BROOM
DIGITALIS PURPUREA L.	FOXGLOVE
ECHIUM VULGARE	BLUEWEED, TEXAS BLUEWEED
ELAEAGNUS ANGUSTIFOLIA	RUSSIAN OLIVE
EUPHORBIA ESULA	LEAFY SPURGE

FALLOPIA X. BOHEMICA, F. JAPONICA (PREV. POLYGONUM CUSPIDATUM, P. JAPONICA)	BOHEMIAN OR JAPANESE KNOTWEED
HYPOCHAERIS RADICATA	SPOTTED CAT'S EAR
IRIS PSEUDACORUS	YELLOW-FLAG IRIS
ISATIS TINCTORIA	DYER'S WOAD
JACOBAEA VULGARIS (PREV. SENECIO JACOBAEA)	TANSY RAGWORT
KNAUTIA ARVENSIS	FIELD SCABIOUS
KOCHIA SCOPARIA	KOCHIA
LEPIDIUM DRABA (PREV. CARDARIA DRABA)	HOARY CRESS, WHITETOP
LEPIDIUM LATIFOLIUM	PERENNIAL PEPPERWEED
LYTHRUM SALICARIA	PURPLE LOOSESTRIFE
MYRIOPHYLLUM SPICATUM	EURASIAN WATERMILFOIL
ONOPORDUM ACANTHIUM	SCOTCH THISTLE
POTENTILLA ARGENTEA	SILVERY CINQUEFOIL
RANUNCULUS ACRIS	TALL BUTTERCUP
SOLANUM DULCAMARA	CLIMBING NIGHTSHADE
SOLANUM ELAEAGNIFOLIUM	SILVERLEAF NIGHTSHADE
TRIFOLIUM ARVENSE	HARE'S FOOT CLOVER
TRIPLEUROSPERMUM MARITIME	SCENTLESS CHAMOMILE
WIDESPREAD WEEDS[3]	
ARTEMISIA ABSINTHIUM	ABSINTH WORMWOOD
BROMUS TECTORUM	CHEATGRASS
CENTAUREA DEBEAUXII (PREV. C. NIGRESCENS)	MEADOW KNAPWEED
CENTAUREA STOEBE	SPOTTED KNAPWEED
CICHORIUM INTYBUS	CHICORY
CIRSIUM ARVENSE	CANADA THISTLE
CIRSIUM VULGARE	BULL THISTLE
CONIUM MACULATUM	POISON HEMLOCK
CYNOGLOSSUM OFFICINALE	HOUNDSTONGUE
HIERACIUM AURANTIACUM	ORANGE HAWKWEED
HIERACIUM CAESPITOSUM	MEADOW/YELLOW HAWKWEED COMPLEX
HYPERCIUM PERFORATUM	ST. JOHNSWORT
LATHYRUS LATIFOLIUS	PERENNIAL PEA
LEUCANTHEMUM VULGARE	OXEYE DAISY
LINARIA DALMATICA	DALMATIAN TOADFLAX
LINARIA VULGARIS	YELLOW TOADFLAX
MATRICARIA DISCOIDEA	PINEAPPLE WEED
MELILOTUS OFFICINALIS	WHITE AND YELLOW SWEET CLOVER

PHALARIS ARUNDINACEA	REED CANARY GRASS
POTENTILLA RECTA	SULFUR CINQUEFOIL
SISYMBRIUM ALTISSIMUM	TUMBLE MUSTARD
SONCHUS ARVENSIS	PERENNIAL SOWTHISTLE
TANACETUM VULGARE	COMMON TANSY
VERBASCUM THAPSUS	MULLEIN
VERONICA CHAMAEDRYS	GERMANDER SPEEDWELL
VERONICA OFFICINALIS	COMMON SPEEDWELL

1. Potential invaders: Goal is to prevent and eradicate promptly if found
2. New invaders: Goal is to eradicate small new infestations and reduce larger infestations
3. Widespread weeds: Goal is to contain inside infested area and reduce plant populations